User

Thursday, 08/05/2008 8:33:48 AM

Julie Lecocq

### **Process Sheet**

Customer

: CU-DARO01 Dart Helicopters Services

Job Number **Estimate Number** 

: 39111 : 10559

P.O. Number

: 08/05/2008

This Issue :»NC Prsht Rev.

: 11 First Issue

: 38991

Type

S.O. No. :

: CROSSTUBES

**Drawing Number Project Number** 

**Drawing Name** 

**Part Number** 

: D412-664-243 REV D : N/A

**Drawing Revision** 

: D Material

**Due Date** 

: 30/05/2008

: D412664203

: HIGH AFT X-TUBE 412

Qty:

1 Um:

Each

**Previous Run** Written By

**Checked & Approved By** 

Comment

Reformat; Added D3189-1 K/DS

Remove Coments on Pick List JLM Est Rev:F 06-03-29 Est Rev:G 06.12.08

Est Rev:H 07-04-30

per ECN 886 As per Rev D

EC JLM

**Additional Product** 

Job Number:



Seq. #:

**Machine Or Operation:** 

Description:

1.0

2.0

4.0

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D412-664-203 CHG 006

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

D412664203TRN

CROSSTUBE TURNING DETAIL



1.0000 Each(s)/Unit Total: Comment: Qty.:

1.0000 Each(s)

CROSSTUBE TURNING DETAIL

339075 batch BENDING

BENDING MACHINE - SKIDTUBES





Comment: BENDING MACHINE

Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010

5.0 QC15 DIMENSIONAL CHECK OF X-TUBES

Comment: DIMENSIONAL CHECK OF X-TUBES

4-5-28

## Dart Aerospace Ltd

<b>W</b> /O:		WORK ORD	WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	Ву	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector		
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		Description of NC		Corrective Action Section	В	Verification	A	Approval QC Inspector				
DATE	STEP	Section A	Initial Chief Eng	Action Description Chief Eng	Sign & Date	Section C	Approval Chief Eng					
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Thursday, 08/05/2008 8:33:48 AM Date: User: Julie Lecocq **Process Sheet** Drawing Name: HIGH AFT X-TUBE 412 Customer: CU-DAR001 Dart Helicopters Services Part Number: D412664203 Job Number: 39111 Job Number: Seq. #: Description: **Machine Or Operation:** CROSSTUBES RESOURCE 1 CROSSTUBES 6.0 Comment: LANDING GEAR RESOURCE 1 1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551 2-Ream hole to finish size in tube as per Dwg D412-664-243using drill Jig DT8550 & DT8551.Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes. 3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243 ZT 08-09-28 HAND FINISHING RESOURCE #1 HAND FINISHING1 7.0 Comment: HAND FINISHING RESOURCE #1 08-09-18 Chemical Conversion Coat as per QSI 005 4.1 INSPECT POWDER COAT/CHEMICAL CONVERSION 8.0 QC3 Comment: INSPE POWDER COAT/CHEMICAL CONVERSION INSPECT WORK TO CURRENT STEP 9.0 QC5 Comment: INSPECT WORK TO CURRENT STEP **OUTSIDE SERVICES -skids** 10.0 Comment: Sub-Contracting OUTSIDE SERVICES Liquid Penetrant Inspection as per QSI 038Or C2081061020 Issue P/O: 6476 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order PACKAGING RESOURCE #1 11.0 Comment: PACKAGING RESOURCE #1 Inspect for transit damage Ensure copy of NDT results attached to work order.

Dart Aerospace	Lta
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W/O:		WORK ORDER CHANGES								
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				N/C Close	d:	Date: _				

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Thursday, 08/05/2008 8:33:48 AM Date: Julie Lecoca User: **Process Sheet** Drawing Name: HIGH AFT X-TUBE 412 Customer: CU-DAR001 Dart Helicopters Services Part Number: D412664203 Job Number: 39111 Job Number: Description: Seq. #: Machine Or Operation: INSPECT WORK TO CURRENT STEP 12.0 QC5 M Comment: Inspect for damage & ensure results are as per Dwg D412-664-203 SPRAY PAINTING SPRAY PAINTING 13.0 Comment: SPRAY PAINTING 1-Prime inside and outside crosstube as per QSI 005 4.2 08 06 021 2-Paint outside crosstube with White Imron as per QSI 005 4.2 INSPECT SPRAY PAINT 14.0 QC14 **Comment: Inspect Spray Paint** Wrap in plastic bag to protect from scratches RUBBER CUSHION D3595063570 4.0000 Each(s) 4.0000 Each(s)/Unit Total: Comment: Qty.: Rubber Cushion Batch: D2856600 Comment: Qty.: 1.7640 f(s)/Unit Total: 1.7640 f(s) Pick: Qty Part number Description Batch 2 D2856-600(Cut to 10.090") Abrasion Strip D28961 17.0 Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s) Pick: **Description Batch** Qty Part number 08 06 05 1 D2896-1 Chafing Shield D31891 18.0 Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s) **Description Batch** Qty Part number 08 06 03 Chafing Sheild 2 D3189-1

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Thursday, 08/05/2008 8:33:48 AM Date: User: Julie Lecocq **Process Sheet** Drawing Name: HIGH AFT X-TUBE 412 Customer: CU-DAR001 Dart Helicopters Services **Part Number:** D412664203 Job Number: 39111 Job Number: Description: Seq. #: Machine Or Operation: Clamp(per MIL-DTL-8783C) MS2192028 19.0 4.0000 Each(s) Comment: Qty.: .0000 Each(s)/Unit Total: Pick: **Description Batch** Qty Part number Clamp 107502 4 MS21920-28 clamp(per MIL-DTL-8783C) 20.0 MS2192030 2.0000 Each(s)/Unit Total: 2.0000 Each(s) Comment: Qty.: clamp(per MIL-DTL-8783C) 08 06 05 batch: 106810 CROSSTUBES 21.0 Comment: LANDING GEAR RESOURCE 1 Assemble as per Dwg D412-664-203 1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe 080605 21 install supports with magnobond as per QSI 015 Adhere for for 12 Hrs Batch: 107621 A/R 6398 Magnobond Expiry Date: 08/2009 Time: 2:30pm 3-Install clamps as per Dwg D212-664-141. Torque clamps to 80-100 in lb. INSPECT WORK TO CURRENT STEP QC5 22.0 Comment: INSPECT WORK TO CURRENT STEP PACKAGING RESOURCE #1 23.0 PACKAGING 1 Comment: PACKAGING RESOURCE #1 Pick Packing Kit Bolt AN640A 24.0 4.0000 Each(s) Comment: Qty.: Total: Bolt Batch:

# Dart Aerospace Ltd

W/O:	-	WORK ORDER CHANGES									
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DATE	STEP	Description of NC		Corrective Action Section B		Verification	Approval	Approval
DAIL		Section A	Initial Chief Eng	Action Description Chief Eng	Sign & Date	Section C	Chief Eng	QC Inspector
08.060 <b>5</b>		by 2 of the mas good,		Carefully remove center Support, and remove all magnational, by sanding the to		ml		
08.08.0	0	upon the torquing coving, it was found upon inspection, I side of the vocker beam was	(3)10-12	re-paint the tube in between the supports as per asions	08:06:05)	08 06 10	25142	08-060
		hitting the side on the chafing sheild.		A/R m 107621	N/ 8 0 10			1
			Fasiw2	Enter support with railorbox Inspect before curing	108 06 D	-1/0B-06-11	asiu12	108.06.06
								:

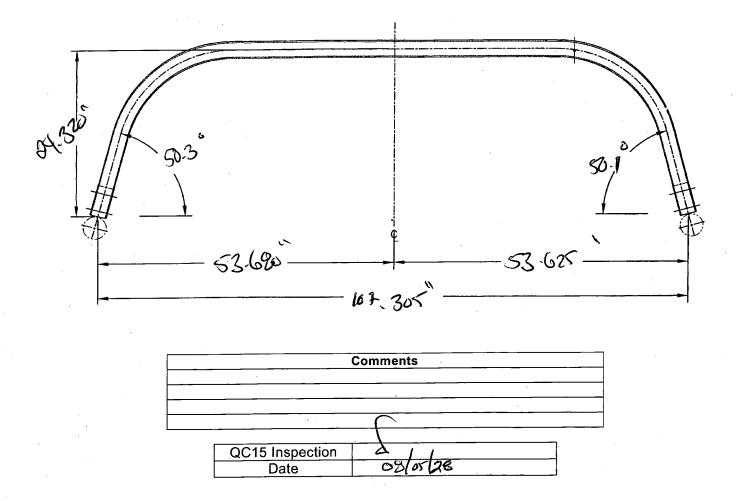
	rsday, 08/05/2008 8:33:48 AM e Lecocq	Process Sheet		
Customer	CU-DAR001 Dart Helicopters Services	Drawing Name: HIGH AFT X-TU	JBE 412	
		D		
Job Number	39111	<b>Part Number:</b> D412664203		
Job Number:				
Seq. #:	Machine Or Operation:	Description :		
25.0	AN641A	Bolt	11881111881111881	
Comm	ent: Qty.: 2.0000 Each(s)/Unit Total	: 2.0000 Each(s)		
	Bolt Batch: <u>/07<i>01</i></u> 3			50
26.0	AN960JD616	Washer	118911189111891	
Comm	ent: Qty.: 18.0000 Each(s)/Unit Tota	I: 18.0000 Each(s)		
	Washer	·		50
27.0	MS21042L6	Nut	- 11000 100 100	
				(-)
Comm	ent: Qty.: 6.0000 Each(s)/Unit Total	: 6.0000 Each(s)		_
	Nut Batch: <u>/05077</u>	8/6/11		SO
28.0	QC4	INSPECT 100% KITS FOR COMPLETENESS		
		/ stocks:(( ( )		
	ent: INSPECT 100% KITS FOR COMPLE	PACKAGING RESOURCE #1		
29.0	PACKAGING 1	PACAGING RESOUNCE #1		$(\kappa)$
Comm	ent: PACKAGING RESOURCE #1		(100.03 (00.03 (00.03 (00.03	
	Identify and pack for shipping as per	PPP D412-664-203	•	
	******Ensure tube is not packaged if o	curing time is less than 12 hrs, see step 27 for ap	oplication time & date	
	Time & date of packaging:	1/11 3:45 pm / /		$\circ$
	Location:Rev:Rev:	× / 6/1	1	SV
30.0	QC21	FINAL INSPECTION/W/O RELEASE		
				08/06/12 +
Comm	ent: FINAL INSPECTION/W/O RELEASE			10
Job Completion			MF	08-06-12
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W/O:			WC	RK ORDER CHANGES	3			
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DATE	STEP	Section A	Initial Chief Eng	Action Description Chief Eng	Sign & Date	Section C	Approval Chief Eng	QC Inspector
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DART AEROSPACE LTD	Work Order:	39111
Description: Crosstube High Aft (412)	Part Number:	D412-664-203
Inspection Dwg: D412-664-243 Rev: D		Page 1 of 1

Required Dimension	Min	Max
Height	24.24	24.50
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.70



Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	1
В	07.05.08	Dimensions updated per Dwg rev. D	KJ/JLM O	fr
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DESIG	PH	DRAWN BY	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA
CHECK		APPROVED	DRAWING NO. REV. D D412-664-243 SHEET 1 OF 3
DATE 07.0	3.09		TITLE SCALE CROSSTUBE ASSEMBLY (412 HI AFT) NTS
Α		01.10.17	NEW ISSUE
В		05.02.04	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES
C		06.10.27	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398 MS21920-32 WAS MS21920-30
D		07.03.09	REMOVE D2732-058, CHANGE TO D3595-063-570

RELEASELY 07.04.24

Qty	Part Number	Description
Х	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
1	D6009-129	CROSSTUBE
2	D3595-063-570	RUBBER CUSHION
1	D2896-1	SUPPORT
2	D2856-600-1009	ABRASION STRIP
4	MS21920-28	CLAMP
2	MS21920-30	CLAMP (OR MS21920-32)
2	D3189-1	CHAFING SHIELD
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

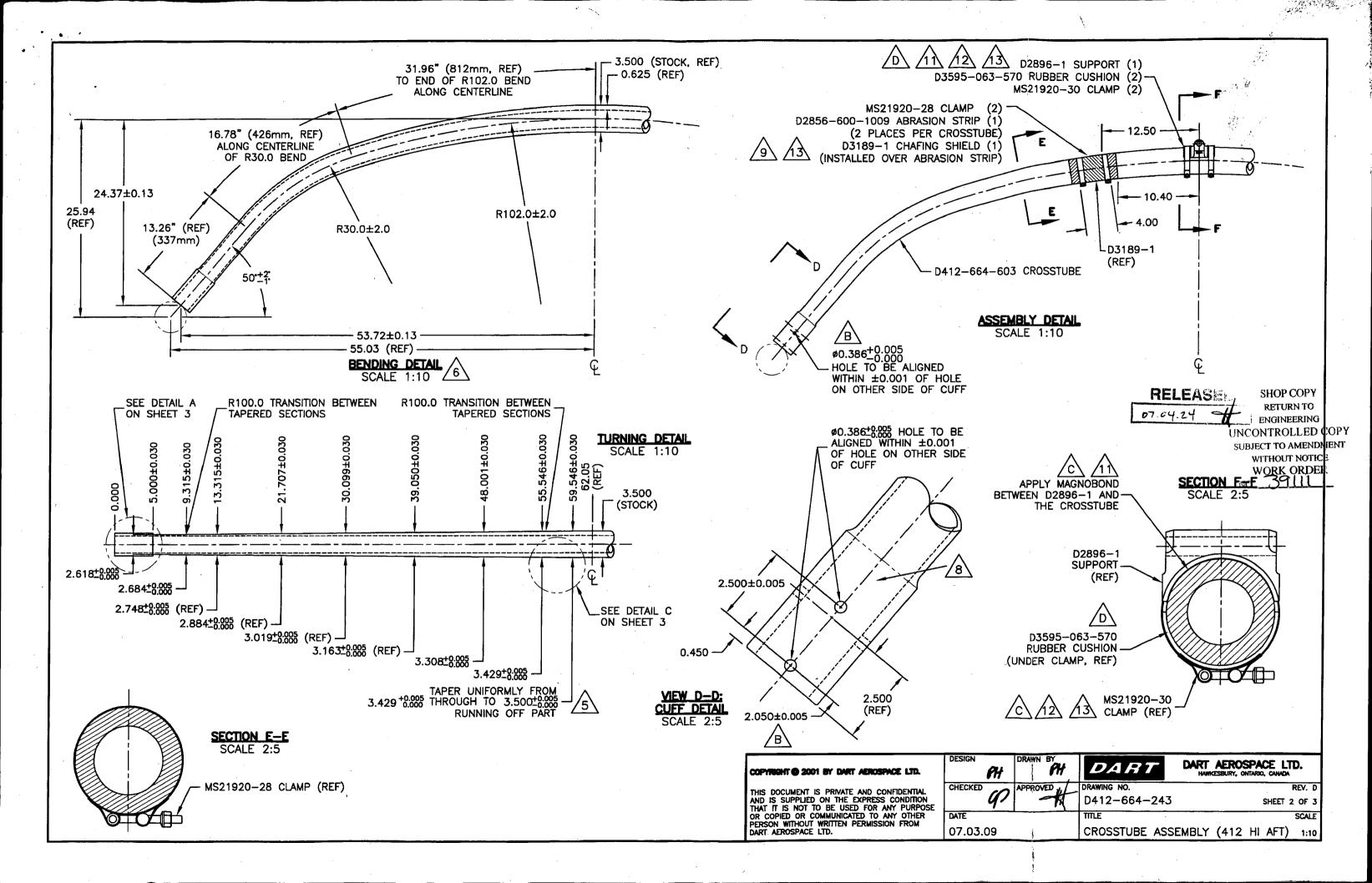
#### **GENERAL NOTES:**

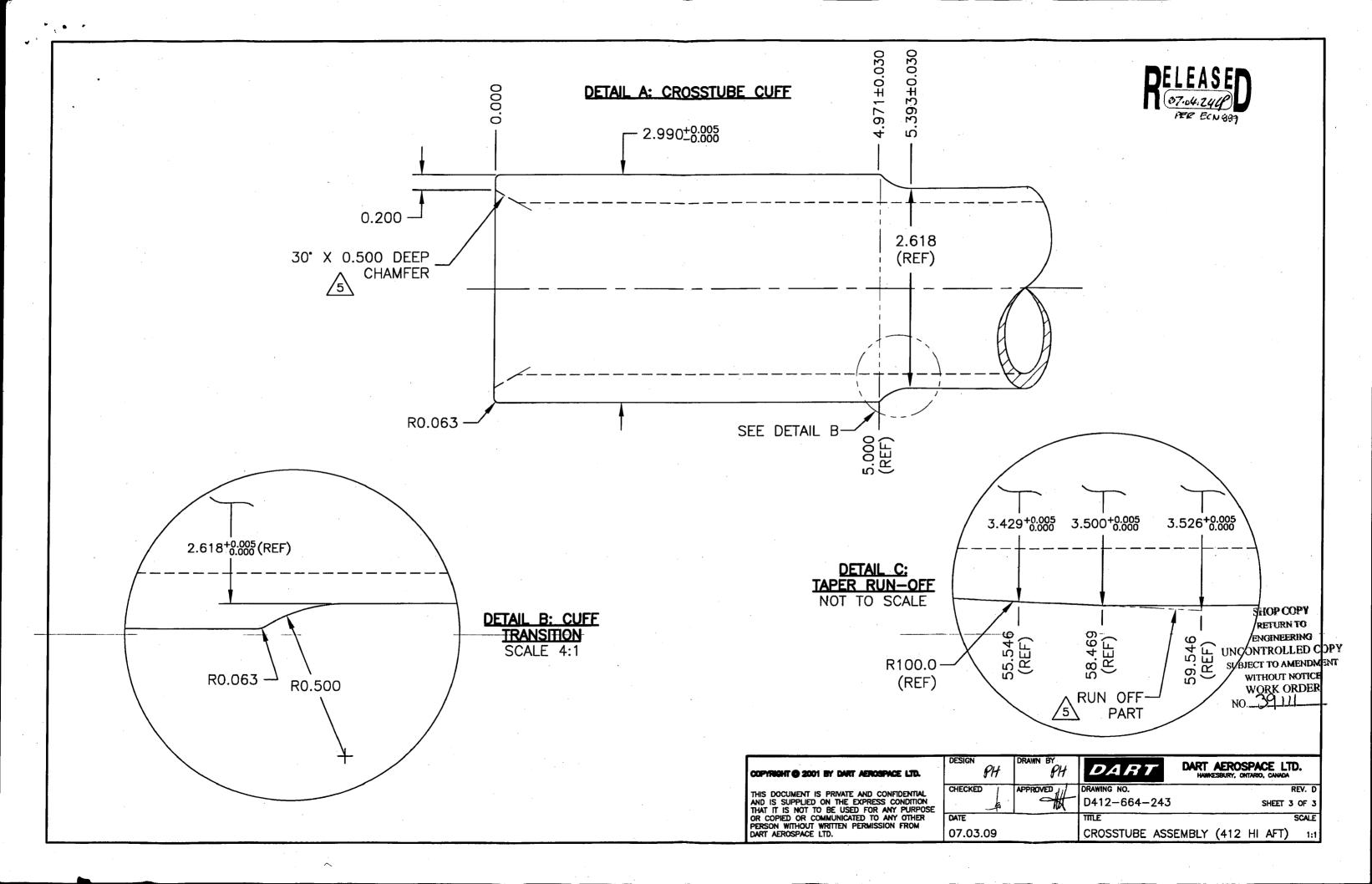
- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6009-129 FINISHED LENGTH = 124.09±0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
  PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
  PAINT OUTSIDE PER DART 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALY, TRANSITION SHOULD BE
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-600-1009 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

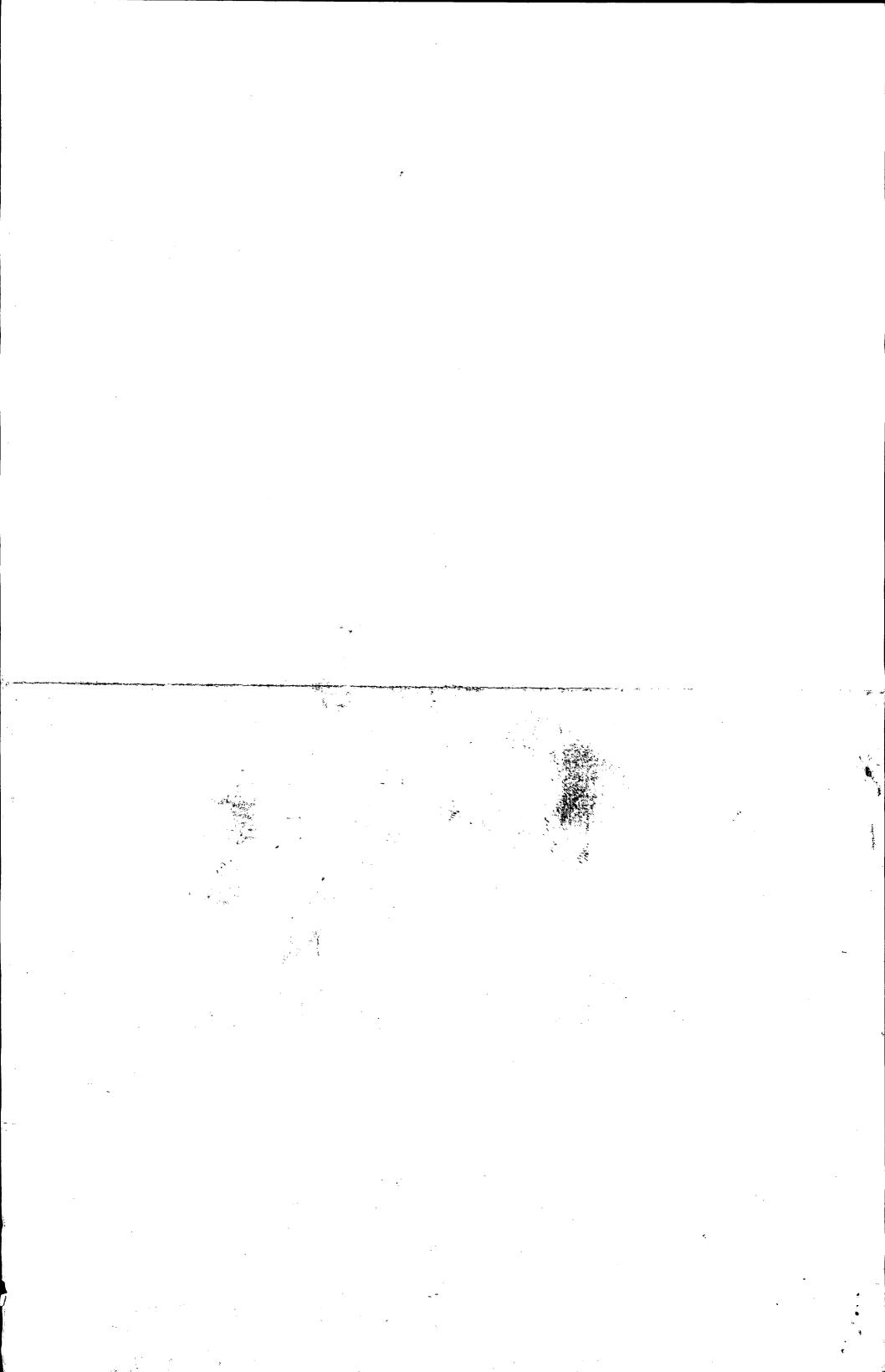
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W/O:			WC	ORK ORDER CHANGES	-					
DATE	STEP	PR	OCEDURE CHA	NGE	Ву	Date	ate Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	
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DATE	STEP	Section A	Initial Chief Eng	Action Description Chief Eng	Sign 8	Sect		Chief Eng	QC Inspector	
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#### LIQUID PENETRANT TEST REPORT P - 13111PAGE OF 1 MAY 30, 2008 DART AEROSPACE PM 🗆 AM 🗆 DATE TIME CLIENT . 188 08 1311 LINDA LACELLE ACUREN JOB NO. ATTENTION 1270 ABERDEEN ST 647 PO/WO No. ADDRESS HAWKESBURY HAWKESBURY, ONT. **WORK LOCATION** ASTM 1417/QSI-038 ACCEPTANCE STD. REV./DATE 412 HIGH AFT X TUBE, 212/205 HIGH AFT X TUBE, 412 LOW NARROW FWD X TUBE, PROJECT JOB#S 412-39111)39534,39535. 212/205-39367, 39368... ITEM(S) EXAMINED LT-TECH2 REV./DATE TECHNIQUE NO. JOB DESCRIPTION PROCEDURE NO. LT-0002 REV./DATE MATERIAL ALODINED ALUM. THICKNESS 'PART NO. D412664203/D212664201/D412664105 WET FLOURESCENT LIQUID PENETRANT INSPECTION CARRIED OUT ON 100% EXTERNAL SURFACE SCOPE **TEST DETAILS** ☐ Post ☑ FLUORESCENT □ VISIBLE WATER WASH ■ SOLVENT REMOVABLE **EMULSIFIED** METHOD BLACK LGHT8171 **Ο** Ουτρυτ > 1000 μ W/cM<sup>2</sup> ☐ AMBIENT < 2 fc **MAGNAFLUX** FAMILY BRAND LIGHTING EQUIP. FLASHLIGHT TROUBLELIGHT OUTPUT>100 fc @ SURFACE MINIMUM DWELL TIME 45 MIN. PENETRANTZL67 MINIMUM DRY TIME >10 MIN. OTHER CAL MAY 1 08 PENETRANT REMOVER H20 CAL DUE DATE 10 LIGHT METER S/N DEVELOPER SKDS2 MINIMUM DWELL TIME MIN. DEVELOPER TYPE ☐ AQUEOUS ☐ DRY MON AQUEOUS **TEST SURFACE** ☑ CLEAN BARE METAL SURFACE CONDITION As GROUND AS WELDED ☐ MACHINED ☐ SHOT BLASTED □ > 52°C/125°F ☐ 10°C/50°F TO 52°C/125°F SURFACE TEMPERATURE - <- 4°C/20°F - 4°C/ 20°F TO 10°C/50°F RESULTS-( METRIC MPERIAL) FLUORESCENT LIQUID PENETRANT INSPECTION CARRIED OUT ON 100% EXTERNAL SURFACE ON: M 0800 02 212/205 HIGH AFT X TUBE JOB#: 39367,39368. 412 HIGH AFT X TUBE JOB#: 39111.) 412 LOW NARROW FWD X TUBE JOB#:39534,39535. **RESULTS: NO INDICATION OF DEFECTS.** ITEMS ACCEPTABLE TO STANDARD

The agreement of Acmen Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly moderation that all descriptions, comments and expressions of opinion reflect the opinions or observations of Active Group Inc. based on information and assumptions supplied by the morre operator and are not intended nor can they be construed as representations or warranties. Activen Group Inc. is not assuming any responsibilities of the owner operator experitions complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Activen Group Inc. In no event shall Activen Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services. Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, express implied, is made or intended by Acuren Group Inc.

SIGNATURES			
CLIENT REPRESENTATIVE			DTR# <u>E 19676</u>
TECHNICIAN (SIGNATURE):	Jewill.	SIGNATURE	REPORT REVIEWED BY:
NAME (PRINT):	JASON HEWETT		NAME INITIALS
	1 <sup>st</sup> TECHNICIAN	2 <sup>NO</sup> TECHNICIAN	·
Í	CGSB LEVEL 2 SNT LEVEL	CGSB LEVEL SNT LEVEL	·
	CGSB REG. NO 6156	CGSB REG. NO	